

LOTS DEVELOPMENT

By Patrick R. Kane



Military amphibious landing forces carry only enough supplies to last through the initial stage of tactical operations. Thus, long-term sustainment of forces ashore must occur soon after landing. Typically, more than 90% of combat equipment and support supplies arrive via sealift. Where port facilities are inadequate or nonexistent, the unloading of sealift ships must be done by a throughput operation called Logistics Over the Shore (LOTS). A critical component of LOTS is the causeway system, which can be assembled into ferries, piers, and other platform configurations.

The most significant factor affecting productivity, or the rate of throughput, in LOTS operations is the state of the sea, commonly shortened to sea state. Recent exercises show throughput effectively ceases in Sea State 3, with damage to causeway system components not uncommon at these high sea conditions. Sea State 3 and below conditions are expected to occur 85% of the time at likely logistics sites; the capability to deliver

A Navy causeway pier that failed under Sea State 3 conditions.

equipment and forces ashore is thus severely jeopardized.

ACB Lighter

The Advanced Causeway Lighterage Team of the Naval Facilities Engineering Service Center (NFESC) is completing the development of an advanced modular causeway system—the Amphibious Cargo Beaching (ACB) Lighter—to solve the Sea State 3 ship-to-shore cargo transfer problem. Innovative module design and advanced connector technologies make Sea State 3 assembly and operations achievable. The ACB Lighter consists of modules 40 feet long, 24 feet wide, and 8 feet high. The oversized modules have several advantages.

They are easy to transport by sea and over land. For overland transport, the module is separated into three 8-foot-wide intermodal assemblies. Aboard ship, the 24-foot-wide module either spans adjacent ISO container cells in the

ship's hold (similar to the Navy Seashed) or is deck-loaded.

The platforms are quick to assemble, fewer are needed in theater, and the various sizes and configurations meet changing needs at a forward logistics site. The platforms include single- and double-wide causeway ferries, roll-on/roll-off platforms, air cushion vehicle landing platforms, causeway piers, and air cushioned transport platforms.

To assemble the platforms in theater, the ACB Lighter requires an at-sea connection system. During in-water assembly, significant relative motions are experienced between the adjoining ends of modules. A bridle system has been designed to overcome these motions and assist the alignment of modules for connection. A rigid pin and guillotine connector is used in the module-to-module configuration, and a flexible connector is used to link larger assemblies, such as causeway ferries.



The ACB Lighter (rear) compared to present-day causeway sections used by the Navy (middle) and the Army (foreground).

Assembled causeway lighters and platforms provide better stability and greater payload capacity due to the extra freeboard and width of the modules in contrast to present-day capabilities. The cargo capacity of an ACB Lighter causeway section is three times greater than that of the existing system; thus, cargo throughput is increased. An even greater payoff is the ca-

pability to operate safely in Sea State 3 conditions.

Testing

The rigid connection system was recently evaluated in quarter-scale model tests that simulated various Sea State 3 conditions; it was able to connect under all conditions tested. The flexible connection system has also been suc-

cessfully tested. Extensive trials of a three-quarter scale model in calm water, as well as limited testing in Sea State 3, have been completed. Lessons learned from these scale-model tests will be integrated into the connection system designs in preparation of a full-scale logistics engineering advanced demonstration funded by the Office of Naval Research.

Outlook

The ACB Lighter means LOTS operations can be conducted an average of 25 days each month, vice 15 days with current LOTS capabilities. The Office of the Chief of Naval Operations has adopted the ACB Lighter to replace future causeway lighter procurements; the Army has also expressed interest. As a joint program, procurement of ACB Lighter assets would exceed \$500M.

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